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ABSTRACT

In this study, the social interaction of 151 children, ages 8 through 13, attending a summer computer camp were observed as they worked with the computers. They were also asked to complete a questionnaire that focused on social dilemmas in a technological environment. The dilemmas focused on the acceptability of copying someone else's program or altering passwords. Analysis of variance and regression techniques were used on the questionnaire data and these were compared to results of the observations. Results indicated distinct behavior patterns. Students had not considered the social implications of using another's information or data nor the right to privacy that might be invaded by the misuse of information technology. When their own privacy was infringed upon, participants demanded harsh penalties. Most students engaged in group problem-solving strategies while solving technology related problems, thus circumventing traditional individualistic learning patterns. While working with information technology systems, student behavior patterns seemed directly related to previous experience with computer games and other popularized forms of information technology. (IS)

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SOCIAL IMPLICATIONS OF TECHNOLOGICAL INNOVATIONS: A STUDY OF ETHICS AND ATTITUDES

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In the late 1970s and early 1980s, various researchers (Baker, 1976; Molnar, 1978; and Chambers and Bork, 1980) suggested that computers would greatly influence instructional activities. Today these predictions have become part of the lexicon of American education. In 1982, over 300,000 micro-computer units were sold to elementary and secondary schools in the United States (U.S. Office of Technological Assessment, 1983). Many state and local school districts have added technological or computer literacy to their curriculums while colleges and universities are increasingly adding forms of computer literacy training to their graduation requirements.

The problems and frustrations associated with any change have accompanied the infusion of micro-technology into the educational system. Inadequate training and the lack of skills needed to identify and produce high-quality educational software have frustrated, and in some cases, negated the impact of this technology. However, such roadblocks are being met with training programs for preservice and inservice teachers. Software publishers also recognize that educational consumers need high-quality materials that support the curriculum and are beginning to produce courseware that supports this notion.

Despite current training programs, a second generation of issues that are broader than literacy and program development still need examination and study (Diem, 1983). The purpose of this study was to examine one of these issues, namely students' interactive social responses to technology in an institutional situation. This

issue lies at the heart of broader societal acceptance of technological innovations and plays an important role within the social studies as it encompasses the value and social participation domain that is at the heart of the social studies curriculum.

Site

The 151 children, ages eight through twelve, in this study were all participants in a computer camp that was held at a mid-size southwestern state university during June and July, 1983. Activities included instructional sessions on the history of computers, field trips to locations on campus and in the community where different types of computer resources were used, and demonstrations of programmable robots. Most of the daily technological sessions were spent with hands-on computer related activities. Tasks ranged from completing assigned instructional projects to independently producing computer programs. The remaining time was spent on lunch and various recreational activities.

The camp staff consisted of two co-directors, two curriculum co-ordinators/counselors, three full-time computer-specialist counselors and four part-time recreational-specialists. The personnel associated with the computer segment of the camp held at least a Master's Degree, had at least five years of teaching experience at the elementary or middle school level, and had prior experience in training children to use microcomputers.

Demographics

The children enrolled in the computer camp came from families

representing wide ranges of socio-economic status, levels of education, and occupations. It must be noted that the cost of the camp, $150.00, excluded many children who might otherwise have attended. Despite this, there were representatives from all segments of the local area as well as several from communities as far as 200 miles away.

Of the 151 children participating in the three camp sessions, 116 (76.8%), were male and 35 (23.2%) female. These figures tend to reinforce the stereo-typical notion that computer technology is essentially a male pervue. Interestingly, female participants were younger than the mean age of all the campers, 9.2 as contrasted to 10.5.

Seventy nine (52.3%) of the participants had computers available to them at home. Apple II micro-computers headed the list followed by Atari 400 and 800 models, with Texas Instruments 99/40's in third place. When participants were asked if they had access to a computer game machine, positive response rose to one hundred and twenty-two (81%). Conversely, less than one-fifth of these participants (30) indicated that they had used computers in their school on a weekly basis. In fact, over half of the students (81) had never worked with computers in classroom situations. With respect to computer useage, seventy seven students (47%) classified themselves as beginners, eighteen (11.9%) indicated they had some familiarity with computers and were intermediate users, and fifty-six (37.1%) stated they had written their own programs and

considered themselves advanced users.

Methodology

Two distinctive methodological constructs were used in this study. The first involved the use of non-participant behavior observation. Although related to other anthropological methodologies, a non-participant observer seeks to remain neutral and trys to avoid the cultural framework of the individuals or people being studied (Bruyn, 1963). The non-participant observer attempts to be a non-interloper within the culture being observed

In this study, groups of two or more children were observed as they worked with various types of microcomputer technology. During the observations, notes were taken and summarized with records indicating the kinds of ethical or socially related issues that were discussed and resolved.

Observations occured only while children were engaged in independent instructional activities. Social and ethical interactions that took place outside the observational setting, in this case the computer laboratory and study area, were not included in this study. All data was gathered singly, by the author. When completed, the observations were then compared for similarities, differences, or points of interest.

The second methodology involved the development and use of a questionnaire that focused on social dilemmas in a technological environment. It was administered at the end of each camp session, and was structured around the following components:

1. Identifying questions (i.e.; age, sex, etc.)
2. Technological familiarity (i.e.; Have you used a computer before?)
3. Social dilemmas (i.e.; Would you alter computer passwords to enlarge your account? Is it acceptable to copy someone else's program?)

Results

During the observations, distinctive behavior patterns among participants became identifiable. In order of frequency these were:

1. While exposed to a variety of technology, both in and out of school, these students had not considered the social implications of using another's information or data. Neither had they considered the right to privacy that might be invaded by the misuse of informational technology.
2. When infringements of their right to privacy took place, participants demanded harsh penalties for the perpetrator.
3. Students engaged in group type problem solving strategies while solving technologically related problems, thus circumventing traditional individualistic type learning environments.
4. Student behavior patterns, while working with information technology systems, seemed directly related to previous experiences with computer games, and other popularized forms of information technology.

In analyzing the data from the questionnaires, differences

were examined and tested for statistical significance using analysis of variance (ANOVA) and regression techniques. Conclusions drawn from this data were then compared with those made from the observations. Questionnaire results tended to reinforce observational analysis.

Discussion

Use of Another's Information - Right to Privacy

The technology employed in this setting functioned as an informational generation resource. That is, users were provided with data that had been put into each machine, processed, and then outputted. The data, itself, was neutral and meaningless until a value was placed on it.

The subjects in this study knew how to use information generated from these machines to solve specific problems. For example, if given a mathematics or spelling program, they all recognized correct or incorrect answers. What they did not consider was the use of these answers by fellow students.

The apparent approval of the sharing of information was borne out by data from the questionnaire. When asked, 82% of this group of students approved the copying of another's program at an F Ratio of 14.4 with a significance of .00. However, the copying of programs did not extend to commercially produced material. In fact, the children rejected that notion by just as strong a feeling as they had accepted the idea of copying a fellow student's work with F = 8.002 and a significance of .00. A "double standard" seemed to be in operation. In effect, these subjects understood that information

has an ownership quality and that when one knows who has produced the information, on a personal basis, that quality is to be upheld and protected. Once the ownership became dispersed, and commercialized, these qualities lost their significance and, in fact, held little in the way of meaning to the users of the information.

The students also learned rather quickly how to abuse the informational systems at hand. A group of older boys, for example, managed to identify one of their colleague's data access code. They then used this to write a derogatory program that appeared when the young man returned to his machine.

At no time during the camp sessions did any student question the right to look at another's information. It was as though all information were open and accessible to anyone who wished to view it. This premise may be acceptable in certain non-competitive situations, but what happens when students, or adults, need that certain "edge"? Will they abuse open access to information? There is evidence to suggest that cheating and misuse of information is highly likely in intensely competitive school situations (Fortune, 1982).

Penalties for Infringement - Right to Privacy

Given the children's ambivalence towards the use of their data by others, one might assume that they would not wish to penalize others for using or copying it. This was not borne out by the observations. In fact, the opposite occured. When students saw

someone else copying "his or her program" or trying to obtain a list of data used to solve a particular problem, he or she demanded that the perpetrator be penalized. One even demanded that the culprit be thrown out of the camp. Others asked that the parents be contacted and informed of the offense. It should be noted that none of the staff forbade the sharing of information at any time. When the children were asked what kind of penalties should be applied to those caught changing bank access codes, stealing through manipulation of technology, or changing school grades by gaining access to a large computer (the War Games syndrome) they responded with recommendations for long jail terms, heavy fines, and expulsion for those caught tampering with grades.

Group Problem Solving Strategies

The environment of the camp situation allowed for individual use of information systems. Children were encouraged to try various programming ideas and seek divergent paths to solve problems related to them. For instructional purposes, students were assigned to work together but these groups often broke down as friendships emerged.

From the first day of each session it appeared that rather than trying to solve a problem or write a program by one's self, one or more individuals would gather together as sounding boards and resources during the process. Individual success, while important, seemed to be deferred, or even forgotten, as group goals took over. When a problem or program was completed, there was

group as well as individual accomplishment.

Patterns of Interaction

Although participants had access to informational technology systems at home, it was noted that few had really interacted with them. Most knew the various parts of the microcomputer system, the keyboard, tape recorder, printer, television, and so forth, but few had actually used their systems in toto. Students often looked for joysticks and repeatedly asked how to plug in game cartridges.

Several pre-packaged programs were available to campers. Among the most popular were those with video game features, including definite winners, the ability to destroy opponents, and score keeping. None of these programs were the traditional video-game types. Although they had been touted by their developers as being highly educative and motivating, participants who used these related that their best features were those that had more competitive rather than educative value.

Summary

The subjects in this study are of a generation that has been a part of the microtechnology miracle since birth. The wonder and confusion that individuals from different generations feel about this technology, including some of their teachers, is not part of their milieu. Most participants simply accepted computers and robots as part of their daily scene.

The acceptance of change is important, but so too is contemplation about the implications that change may bring about.

The children, in this study, had not previously thought through the ramifications of the use and misuses of technology, and of the information spawned by it. Discussions on this topic had not taken place to any great extent either at home or in their classrooms. Information obtained from the questionnaires noted that most of the subjects in this study, 138 (91%), also had not had any school related instruction or discussion on issues relating to the use and abuse of computer or information technology systems.

If the elementary social studies curriculum is to play a viable role in schools, it must include some consideration of the social skills necessary to deal with technology. As Wilcox (1982) has stated: "The ability to demonstrate a particular skill depends on context. The acquisition of particular skills depends not so much on individual characteristics as on the types of skills demanded by the environment."

Society now demands that schools provide instruction in the uses of technology. A variety of instructional skills encompasses this change. Yet, neglect of social and citizenship skills, especially those that emphasize the use and abuse of information, ethical standards, and attitudinal development will inhibit societal change and preclude the successful integration of technology within the social studies curriculum.

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